

IN THE CLAIMS:

Please cancel Claims 1-4, 11, 12 and 15-18 without prejudice to or disclaimer of the subject matter presented therein.

Please amend Claims 19 and 21 as follows.

1. - 4. (Canceled).

5. (Original) An image processing apparatus which converts multilevel image data into frequency component data for each pixel block of a predetermined size to compression-code the multilevel image data, and multiplexes noise on the multilevel image to embed visible additional information with a noise-multiplexed distribution, comprising:

input means for inputting, as the additional information, information representing whether or not to multiplex noise for each pixel block of the predetermined size;

determination means for determining on the basis of the input additional information whether a pixel block of interest is located at a position where noise is to be multiplexed;

specifying means for, when said determination means determines that the pixel block of interest is located at the position where noise is to be multiplexed, specifying a second bit region where noise is to be multiplexed, on the basis of a state of a first bit region in data which constitutes a low frequency component after conversion of the pixel block of interest; and

change means for reversibly changing bit information for the second bit region in the data of the low frequency component specified by said specifying means.

6. (Original) The apparatus according to claim 5, wherein the conversion into the frequency component includes orthogonal transform, and the low frequency component includes a DC component after orthogonal transform.

7. (Original) The apparatus according to claim 5, wherein the conversion into the frequency component includes wavelet transform, and the low frequency component includes data of a block of a low frequency component that is generated by wavelet transform a plurality of number of times.

8. (Original) The apparatus according to claim 5, wherein, in a case where the multilevel image data includes multilevel image data using a luminance value as a reference, the first bit region includes a predetermined number of upper bits including a most significant bit, and the second bit region includes lower m bits which include a least significant bit and change in accordance with a value of the second bit region.

9. (Original) The apparatus according to claim 5, wherein
the image processing apparatus further comprises means for setting information on an intensity for multiplexing noise, and
said specifying means specifies the second bit region on the basis of the set intensity information and the state of the first bit region.

10. (Original) An image processing apparatus which removes visible additional information from multilevel image data that is compression-coded by reversibly embedding noise, multiplexing the visible additional information, and converting the data into frequency component data for each pixel block of a predetermined size, comprising:

input means for inputting, as the additional information, information representing whether or not to multiplex noise for each pixel block of the predetermined size;

determination means for determining on the basis of the input additional information whether a pixel block of interest is located at a position where noise is multiplexed;

specifying means for, when said determination means determines that the pixel block of interest is located at the position where noise is multiplexed, specifying a noise-multiplexed second bit region on the basis of a first bit region in data which constitutes a low frequency component after frequency conversion of the pixel block of interest; and

reconstruction means for performing conversion inverse to noise multiplexing to reconstruct a state of the second bit region of the pixel block of interest specified by said specifying means into a state before multiplexing.

11. - 12. (Canceled)

13. (Original) An image processing method of converting multilevel image data into frequency component data for each pixel block of a predetermined size to compression-code the multilevel image data, and multiplexing noise on the multilevel image to embed visible additional information with a noise-multiplexed distribution, comprising:

an input step of inputting, as the additional information, information representing whether or not to multiplex noise for each pixel block of the predetermined size;

a determination step of determining on the basis of the input additional information whether a pixel block of interest is located at a position where noise is to be multiplexed;

a specifying step of, when the pixel block of interest is determined in the determination step to be located at the position where noise is to be multiplexed, specifying a second bit region where noise is to be multiplexed, on the basis of a state of a first bit region in data which constitutes a low frequency component after conversion of the pixel block of interest; and

a change step of reversibly changing bit information for the second bit region in the data of the low frequency component specified in the specifying step.

14. (Original) An image processing method of removing visible additional information from multilevel data that is compression-coded by reversibly embedding noise, multiplexing the visible additional information, and converting the data into frequency component data for each pixel block of a predetermined size, comprising:

an input step of inputting, as the additional information, information representing whether or not to multiplex noise for each pixel block of the predetermined size;

a determination step of determining on the basis of the input additional information whether a pixel block of interest is located at a position where noise is multiplexed;

a specifying step of, when the pixel block of interest is determined in the determination step to be located at the position where noise is multiplexed, specifying a noise-multiplexed second bit region on the basis of a state of a first bit region in data which constitutes a low frequency component after frequency conversion of the pixel block of interest; and

a reconstruction step of performing conversion inverse to noise multiplexing to reconstruct a state of the second bit region of the pixel block of interest specified in the specifying step into state before multiplexing.

15. - 18. (Canceled).

19. (Currently Amended) A computer program functioning, embodied in a computer-readable medium, for causing an apparatus to function as an image processing apparatus which converts multilevel image data into frequency component data for each pixel block of a predetermined size to compression-code the multilevel image data, and multiplexes noise on the multilevel image to embed visible additional information with a noise-multiplexed distribution, functioning wherein said program causes the apparatus to function as:

input means for inputting, as the additional information, information representing whether or not to multiplex noise for each pixel block of the predetermined size;

determination means for determining on the basis of the input additional information whether a pixel block of interest is located at a position where noise is to be multiplexed;

specifying means for, when said determination means determines that the pixel block of interest is located at the position where noise is to be multiplexed, specifying a second bit region where noise is to be multiplexed, on the basis of a state of a first bit region in data which constitutes a low frequency component after conversion of the pixel block of interest; and

change means reversibly changing bit information for the second bit region in the data of the low frequency component specified by said specifying means.

20. (Original) A computer-readable storage medium storing a computer program defined in claim 19.

21. (Currently Amended) A computer program ~~functioning, embodied in a computer-readable medium, for causing an apparatus to function~~ as an image processing apparatus which removes visible additional information from multilevel image data that is compression-coded by reversibly embedding noise, multiplexing the visible additional information, and converting the data into frequency component data for each pixel block of a predetermined size, functioning as:

input means for inputting, as the additional information, information representing whether or not to multiplex noise for each pixel block of the predetermined size;

determination means for determining on the basis of the input additional information whether a pixel block of interest is located at a position where noise is multiplexed;

specifying means for, when said determination means determines that the pixel block of interest is located at the position where noise is multiplexed, specifying a noise-multiplexed

second bit region on the basis of a state of a first bit region in data which constitutes a low frequency component after frequency conversion of the pixel block of interest; and

reconstruction means for performing conversion inverse to noise multiplexing to reconstruct a state of the second bit region of the pixel block of interest specified by said specifying means into a state before multiplexing.

22. (Original) A computer-readable storage medium storing a computer program defined in claim 21.